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THE GENUS TORREYOCHLOA

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In a recent issue of Rhodora, Clausen (1952) has agreed with the author's removal (Church, 1949) of the open-sheathed *Torreyochloa pallida* (Torr.) Church [*Glyceria pallida* (Torr.) Trin.] from its anomalous position in *Glyceria*, a genus which is unusual in its character of closed sheaths. Rather than recognize the distinct generic status of the species, however, Clausen has transferred it to a new section of *Puccinellia*.

The taxonomic vicissitudes of *Puccinellia*, including its confusion with *Glyceria*, were reviewed by Fernald and Weatherby (1916). The genus is readily separated from *Glyceria* on the basis of the faint nervation of the lemmas, together with the usual caespitose habit, the inrolling of the leaf margins, the stiff (rather than strongly flexuous) panicle branches and the alkaline habitat. Furthermore, an examination of both Old and New World collections will reveal the fact that all three above mentioned genera may be separated not only by the spikelet characters but those of the caryopses as well, according to the following key:

Leaf sheaths connate; upper glumes uni-nerved; styles present; caryopsis narrowly or broadly ovoid (occasionally obovoid), dark castanaceous, and bearing a long, linear hilum and apical, remnant styles ..... *Glyceria.*

Leaf sheaths free and overlapping; upper glume trinerved; styles absent.

Lemma nerves prominent; caryopsis broadly ovoid, dark honey colored, and bearing a reddish brown, oblong hilum—one third the length of the grain, the apex crowned with stiff, rather connate bristles in addition to remnant stigmas ..... *Torreyochloa.*

Lemma nerves obscure; caryopsis fusiform, medium to olive-brown, and bearing a chestnut-brown, oval, subbasal hilum, the apex covered with matted, remnant stigmas only ..... *Puccinellia.*

Again, the three genera may be distinguished on the basis of the cell patterns in the leaf epidermis, which are revealed in easily prepared, microscope slide mounts. These characters have been employed successfully by Prat (1936) in interpreting taxonomic relationships in the Gramineae. With respect to *Glyceria*, members of the sections *Euglyceria* and *Hydropoa* have epidermal cells with smooth walls and papillae (silicified projections) while the section *Striatae* is typified by smooth walls of cells lacking papillae. In *Torreyochloa* the cells have rippled walls and lack papillae while those of *Puccinellia* have rippled walls and abundant papillae.

Finally, cytological studies reveal the fact that the chromosomes of all three genera are distinct with respect to structural characters of width and length (Church, 1949). The chromosomes of *Glyceria* are small (medium in *Hydropoa*), while in *Puccinellia* they are narrow and long. *Torreyochloa*, however, has chromosomes that are large in all dimensions. The similarity of the basic chromosome number of seven in the latter two genera does not necessarily indicate close affinity, especially when the aforementioned structural differences are considered.

As further evidence of the relationship between *Torreyochloa* and *Puccinellia*, Clausen cites the similarity of open sheaths, triple-nerved upper glumes and branching stigmas. On the basis of these characters, as well as the additional ones of faint lemma nervation and alkaline habitat, the *Nevadensis* section of *Poa* might be united with *Puccinellia*. Again, in this case, however, the leaf epidermis, caryopses and chromosome morphology all present differences sufficient for the maintenance of distinct genera. With regard to this same group of characters, *Torreyochloa* remains equally distinct.

The fact noted by Clausen that *Torreyochloa pallida* and *Puccinellia distans* (L.) Parl. grow under identical conditions in the Montezuma marshes in central New York is an illustration of the wide range of adaptability of the latter species which is a European introduction. According to Hegi (1935), *P. distans* shows much less of a preference for alkaline habitats than the other well known Puccinellias of the littoral zone. One European variety of *P. distans*, grows even in essentially fresh habitats. *P. grandis* Swallen of the Pacific coast will thrive in practically

neutral soil under greenhouse conditions. The approximation of habitat preference in the apparently rare cases of species in the two genera would hardly seem to be a reason for their merger into one genus, however.

Although *Torreyochloa* has not been accepted by either Fernald (1950) in the eighth edition of Gray's Manual or Chase (1950) in the revised edition of the Manual of Grasses, one cannot assume that these authors would have departed from a conservative point of view and concurred with Clausen's expanded concept of *Puccinellia*. On the other hand, Swallen (1951) has accepted *Torreyochloa* in his treatment of the Gramineae in the Arizona Flora of Kearney and Peebles.

For the present, Clausen has made a transfer to *Puccinellia* only of *T. pallida*, since he considers the taxonomic status of the other species of *Torreyochloa* uncertain. It is very difficult, however, to concede this point of view with respect to the well known *T. pauciflora* (Presl.) Church. Undoubtedly, it may be considered a vicarious species (Cain, 1944) in the sense that it is the western counterpart of the eastern *T. pallida*, from which it is distinct, nevertheless, in being commonly one meter tall, thick-stemmed and wide-leaved. In contrast, *T. pallida* is typified by short, weak, decumbent stems and narrow leaves. *T. erecta* (Hitch.) Church and *T. fernaldii* (Hitch.) Church are extremes that probably do not merit specific rank. *T. otisii* (Hitch.) Church is a rare species of the Olympic Peninsula, but an examination of the few specimens available reveals all of the distinct characters clearly noted in the Manual of Grasses. *T. natans* (Kom.) Church and *T. viridis* (Honda) Church of eastern Asia may require further study as to range, but they both show the characteristic caryopsis and leaf epidermis features of the genus.

Since *Torreyochloa* may be distinguished from *Puccinellia* on morphological grounds, even without the cytological evidence, Clausen's suggested merger of the two genera introduces an unnatural element into *Puccinellia*, which otherwise remains as a very uniformly composed genus.—Dept. of Botany, Brown University, Providence, R. I.

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THE DISTRIBUTION OF ARNICA WILSONII RYDBERG AND ITS SIGNIFICANCE[1]

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Arnica wilsonii Rydb. belongs to the *A. lonchophylla* Greene group and was long known only by the type collection made in 1902 about 140 miles up the Kapiscow River in northern Ontario. It was collected anew in 1946 by Dutilly and Lepage in northern Ontario, about 50 miles up the Attawapiskat, and again in 1950 by Schofield in northern Manitoba, on the Limestone River, about 50 miles west of Hudson Bay. This type of distribution, inland from the Hudson Bay and along a line roughly parallel with the present shoreline, is rather unexpected.

It has long been known that a number of entities presenting a disjunct range occur along the southern edge of Hudson and James Bays. The intervening area of northern Ontario and adjacent Quebec and Manitoba was very little known botanically, but it was expected that, when better known, it would show that many of those disjunct species really have a continuous range. As new collections continue to be made in this area, relatively few intervening localities for these disjunct species are turning up, but instead a new series of disjunct ranges is being discovered. These disjunct ranges seem to fall into four types:

1—Prairie outliers, such as *Linum lepagei* Boivin, a vicariant of *L. lewisii* Pursh, a common species in the Canadian Prairie.

[1] Contribution No. 1184, from the Division of Botany and Plant Pathology, Science Service, Department of Agriculture, Ottawa, Canada.